The invention claimed is:

1. A process for the desulfurization of a full boiling range naphtha comprising the steps of:

(a) feeding (1) a full boiling range naphtha containing olefins, diolefins, organic sulfur compounds comprising mercaptans and thiophene and (2) hydrogen to a first distillation column reactor;

(b) concurrently in said first distillation column reactor:

(i) contacting the thiophene contained within said full boiling range naphtha in the presence of a hydrogenation catalyst in a first distillation reaction zone in the lower section of said first distillation column reactor to convert a portion of the thiophene to n-butyl mercaptan,

(i) contacting the diolefins and mercaptans in the presence of a Group VIII metal catalyst in a second distillation reaction in the upper section of said distillation column reactor thereby reacting a portion of said mercaptans with a portion of the diolefins to form sulfide products and a distillate product and

(iii) fractionating said full boiling range naphtha into a light naphtha and a heavier naphtha, said heavier naphtha containing said organic sulfur compounds and said sulfide products;

(c) removing said distillate product as a first overheads from said first distillation column reactor; and

(d) removing said heavier naphtha from said first distillation column reactor as bottoms.

2. The process according to claim 1 further comprising the steps of:

(e) feeding said bottoms and hydrogen to a second distillation column reactor;

(f) concurrently in said second distillation column reactor:

(i) contacting sulfur compounds comprising the organic sulfur compounds in said heavier naphtha with hydrogen in the presence of a hydrodesulfurization catalyst in a hydrodesulfurization zone to convert a portion of said organic sulfur compounds to hydrogen sulfide, and

(ii) fractionating said heavier naphtha into an intermediate

naphtha having a boiling range of about 160°F to about 300°F and a heavy naphtha;

(g) removing said intermediate naphtha and said hydrogen sulfide from said second distillation column reactor as a second overheads; and

(h) removing said heavy naphtha containing sulfur compounds comprising said sulfides from said distillation column reactor as a second bottoms.

3. The process according to claim 2 wherein said light naphtha has a boiling range of C_5 to about 180°F, said heavier naphtha has a boiling range of above 180°F, said intermediate naphtha has a boiling range of about 180°F to about 300°F and said heavy naphtha has a boiling range of above about 300°F.

4. The process according to claim 3 wherein said Group VIII metal catalyst comprises a supported nickel catalyst and said hydrodesulfurization catalyst comprises 2-5 wt.% cobalt and 5-20 wt.% molybdenum on an alumina support.

5. The process according to claim 1 wherein said Group VIII metal catalyst comprises a supported nickel catalyst.

6. The process according to claim 1 wherein said Group VIII metal catalyst comprises a supported palladium oxide catalyst.

7. The process according to claim 1 where substantially all of said mercaptans react with diolefins to form sulfides.

8. The process according to claim 2 wherein said hydrodesulfurization catalyst comprises 2-5 wt.% cobalt and 5-20 wt.% molybdenum on an alumina support.

9. The process according to claim 2 wherein the naphtha products are recombined and the total sulfur content of the recombined product is less than 50 wppm.

10. A process for the desulfurization of a full boiling range catalytically cracked naphtha comprising the steps of:

(a) feeding (1) a full boiling range cracked naphtha containing olefins, diolefins and organic sulfur compounds comprising mercaptans and thiophene

and (2) hydrogen to a first distillation column reactor;

(b) concurrently in said first distillation column reactor

(i) contacting the thiophene contained within said full boiling range naphtha in the presence of a hydrogenation catalyst in a first distillation reaction zone in the lower section of said first distillation column reactor to convert a substantial portion of the thiophene to n-butyl mercaptan,

(i) contacting the diolefins and mercaptans in said full boiling range naphtha and the n-butyl mercaptan produced in said first distillation reaction zone in the presence of a Group VIII metal catalyst in a second distillation reaction zone in the upper section of said distillation column reactor thereby reacting a portion of said mercaptans with a portion of the diolefins to form sulfide products and a distillate product and

(iii) fractionating said full boiling range naphtha into a light naphtha and a heavier naphtha, said heavier naphtha containing said organic sulfur compounds and said sulfide products;

(c) removing said distillate product as a first overheads from said first distillation column reactor;

(d) removing said heavier naphtha from said first distillation column reactor as bottoms;

(e) feeding said bottoms and hydrogen to a second distillation column reactor;

(f) concurrently in said second distillation column reactor

(i) contacting sulfur compounds comprising the organic sulfur compounds contained within said heavier naphtha with hydrogen in the presence of a hydrodesulfurization catalyst in a hydrodesulfurization section of said second distillation column reactor to convert a portion of said organic sulfur compounds to hydrogen sulfide, and

(ii) fractionating said heavier naphtha into an intermediate naphtha having a boiling range of about 180°F to about 300°F and a heavy naphtha boiling above about 300°F;

(g) removing said intermediate naphtha containing sulfur compounds comprising said sulfides and said hydrogen sulfide from said second distillation

column reactor as a second overheads; and

(h) removing said heavy naphtha from said distillation column reactor as a second bottoms.

11. The process according to claim 10 wherein said hydrodesulfurization catalyst comprises 2-5 wt.% cobalt and 5-20 wt.% molybdenum on an alumina support.

12. The process according to claim 10 wherein the naphtha products are recombined and the total sulfur content of the recombined product is less than 50 wppm.